

AMENDMENTS TO THE CLAIMS:

This listing of the claims will replace all prior versions, and listings, of the claims in this application:

Please cancel claims 38, 41, 43, 44, 47, 52, and 53 without prejudice or disclaimer.

Listing of Claims:

1.-18. (Canceled).

19. (Currently Amended) A diffusion barrier comprising a plurality of stacked amorphous sub-layers, each sub-layer having a thickness of about 0.4 to about 4.5 nanometers (nm) ~~where interfaces between the sub-layers inhibit the formation of a crystalline lattice,~~ wherein the plurality of stacked amorphous sub-layers are arranged collectively to inhibit diffusion of a chemical species through the diffusion barrier, ~~wherein a successive sub-layer comprises a different material from a material that comprises a preceding sub-layer and the different materials selected to comprise the sub-layers are substantially immiscible and exhibit mutual adhesion,~~ and where the plurality of stacked amorphous sub-layers are three or more stacked amorphous sub-layers, wherein the stacked amorphous sub-layers are of alternating composition, where an amorphous sub-layer a layer of tantalum (Ta) alternates with an amorphous sub-layer a layer of one of the following metals: copper (Cu), scandium (Sc), yttrium (Y), and lanthanum (La) wherein the amorphous sub-layers in the diffusion barrier are mutually adhesive.

20.-60. (Canceled).

61. (Currently Amended) A diffusion barrier as in claim 19, where the plurality of sub-layers in the diffusion barrier are between three and ten in number.

62-65. (Canceled).

66. (New) A diffusion barrier as in claim 19, wherein the diffusion barrier is a circuit interconnect.

67. (New) A diffusion barrier comprising a plurality of stacked amorphous sub-layers, each sub-layer having a thickness of about 0.4 to about 4.5 nanometers (nm), wherein the plurality of stacked amorphous sub-layers are arranged collectively to inhibit diffusion of a chemical species through the diffusion barrier, and where the plurality of stacked amorphous sub-layers are three or more stacked amorphous sub-layers, wherein the stacked amorphous sub-layers are of alternating composition, where an amorphous sub-layer of tantalum (Ta) alternates with an amorphous sub-layer of scandium (Sc), wherein the amorphous sub-layers in the diffusion barrier are mutually adhesive.

68. (New) A diffusion barrier as in claim 67, where the plurality of sub-layers in the diffusion barrier are between three and ten in number.

69. (New) A diffusion barrier as in claim 67, wherein the diffusion barrier is a circuit interconnect.

70. (New) A diffusion barrier comprising a plurality of stacked amorphous sub-layers, each sub-layer having a thickness of about 0.4 to about 4.5 nanometers (nm), wherein the plurality of stacked amorphous sub-layers are arranged collectively to inhibit diffusion of a chemical species through the diffusion barrier, and where the plurality of stacked amorphous sub-layers are three or more stacked amorphous sub-layers, wherein the stacked amorphous sub-layers are of alternating composition, where an amorphous sub-layer of tantalum (Ta) alternates with an amorphous sub-layer of yttrium (Y), wherein the amorphous sub-layers in the diffusion barrier are mutually adhesive.

71. (New) A diffusion barrier as in claim 70, where the plurality of sub-layers in the diffusion barrier are between three and ten in number.

72. (New) A diffusion barrier as in claim 70, wherein the diffusion barrier is a circuit interconnect.

73. (New) A diffusion barrier comprising a plurality of stacked amorphous sub-layers,

Serial No.: 10/674,853

GAU: 2822

each sub-layer having a thickness of about 0.4 to about 4.5 nanometers (nm), wherein the plurality of stacked amorphous sub-layers are arranged collectively to inhibit diffusion of a chemical species through the diffusion barrier, and where the plurality of stacked amorphous sub-layers are three or more stacked amorphous sub-layers, wherein the stacked amorphous sub-layers are of alternating composition, where an amorphous sub-layer of tantalum (Ta) alternates with an amorphous sub-layer of lanthanum (La), wherein the amorphous sub-layers in the diffusion barrier are mutually adhesive.

74. (New) A diffusion barrier as in claim 73, where the plurality of sub-layers in the diffusion barrier are between three and ten in number.

75. (New) A diffusion barrier as in claim 73, wherein the diffusion barrier is a circuit interconnect.

76. (New) A diffusion barrier comprising a plurality of stacked amorphous sub-layers, each sub-layer having a thickness of about 0.4 to about 4.5 nanometers (nm), wherein the plurality of stacked amorphous sub-layers are arranged collectively to inhibit diffusion of a chemical species through the diffusion barrier, and where the plurality of stacked amorphous sub-layers are three or more stacked amorphous sub-layers, wherein the stacked amorphous sub-layers are of alternating composition, where an amorphous sub-layer of tantalum (Ta) alternates with an amorphous sub-layer of tungsten nitride (WN), wherein the amorphous sub-layers in the diffusion barrier are mutually adhesive.

77. (New) A diffusion barrier as in claim 76, where the plurality of sub-layers in the diffusion barrier are between three and ten in number.

78. (New) A diffusion barrier as in claim 76, wherein the diffusion barrier is a circuit interconnect.

79. (New) A diffusion barrier comprising a plurality of stacked amorphous sub-layers, each sub-layer having a thickness of about 0.4 to about 4.5 nanometers (nm), wherein the plurality of stacked amorphous sub-layers are arranged collectively to inhibit diffusion of

a chemical species through the diffusion barrier, and where the plurality of stacked amorphous sub-layers are three or more stacked amorphous sub-layers, wherein the stacked amorphous sub-layers are of alternating composition, where an amorphous sub-layer of tantalum (Ta) alternates with an amorphous sub-layer of tantalum nitride (TaN), wherein the amorphous sub-layers in the diffusion barrier are mutually adhesive.

80. (New) A diffusion barrier as in claim 79, where the plurality of sub-layers in the diffusion barrier are between three and ten in number.

81. (New) A diffusion barrier as in claim 79, wherein the diffusion barrier is a circuit interconnect.

82. (New) A diffusion barrier as in claim 19, wherein each sub-layer has a thickness of about 0.4 to about 1.5 nanometers (nm).

83. (New) A diffusion barrier as in claim 67, wherein each sub-layer has a thickness of about 0.4 to about 1.5 nanometers (nm).

84. (New) A diffusion barrier as in claim 70, wherein each sub-layer has a thickness of about 0.4 to about 1.5 nanometers (nm).

85. (New) A diffusion barrier as in claim 73, wherein each sub-layer has a thickness of about 0.4 to about 1.5 nanometers (nm).

86. (New) A diffusion barrier as in claim 76, wherein each sub-layer has a thickness of about 0.4 to about 1.5 nanometers (nm).

87. (New) A diffusion barrier as in claim 79, wherein each sub-layer has a thickness of about 0.4 to about 1.5 nanometers (nm).

82. (New) A diffusion barrier as in claim 19, wherein each sub-layer has a thickness of

Serial No.: 10/674,853

GAU: 2822

about 0.4 to about 1.5 nanometers (nm).

83. (New) A diffusion barrier as in claim 67, wherein each sub-layer has a thickness of about 0.4 to about 1.5 nanometers (nm).

84. (New) A diffusion barrier as in claim 70, wherein each sub-layer has a thickness of about 0.4 to about 1.5 nanometers (nm).

85. (New) A diffusion barrier as in claim 73, wherein each sub-layer has a thickness of about 0.4 to about 1.5 nanometers (nm).

86. (New) A diffusion barrier as in claim 76, wherein each sub-layer has a thickness of about 0.4 to about 1.5 nanometers (nm).

87. (New) A diffusion barrier as in claim 79, wherein each sub-layer has a thickness of about 0.4 to about 1.5 nanometers (nm).

88. (New) A diffusion barrier as in claim 19, wherein the diffusion barrier is electrically conductive.

89. (New) A diffusion barrier as in claim 67, wherein the diffusion barrier is electrically conductive.

90. (New) A diffusion barrier as in claim 70, wherein the diffusion barrier is electrically conductive.

91. (New) A diffusion barrier as in claim 73, wherein the diffusion barrier is electrically conductive.

92. (New) A diffusion barrier as in claim 76, wherein the diffusion barrier is electrically conductive.

Serial No.: 10/674,853

GAU: 2822

93. (New) A diffusion barrier as in claim 79, wherein the diffusion barrier is electrically conductive.